PATENT COOPERATION TREATY

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INTERNATIONAL SEARCHING AUTHORITY

To:

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PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43*bis*.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/GB2004/002511	14.06.2004	14.06.2003

International Patent Classification (IPC) or both national classification and IPC
G06F3/033, G06K11/00, H03K17/96

Applicant
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1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☒ Box No. VII Certain defects in the international application
- ☒ Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notifed the International Bureau under Rule 66.1*bis*(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

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WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/GB2004/002511

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

   ☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).

2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:

   a. type of material:

   ☐ a sequence listing

   ☐ table(s) related to the sequence listing

   b. format of material:

   ☐ in written format

   ☐ in computer readable form

   c. time of filing/furnishing:

   ☐ contained in the international application as filed.

   ☐ filed together with the international application in computer readable form.

   ☐ furnished subsequently to this Authority for the purposes of search.

3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

4. Additional comments:

Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	4,9,11-45
	No:	Claims	1,2,3,5,6,7,8,10
Inventive step (IS)	Yes:	Claims	
	No:	Claims	1-45
Industrial applicability (IA)	Yes:	Claims	1-45
	No:	Claims	

2. Citations and explanations

see separate sheet

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

Ad V.2 - novelty, inventive step; citations and explanations

The following documents are cited:

D1: US 5,942,733
D2: US 6,137,427 cited in the application
D3: US 4,686,332
D4: EP 1 251 455 A2

1.1 The application **relates to** capacitive touch pads where changes in capacitance of intersecting conductors (grid or array arrangement) are sensed in order to detect the position of a user's finger on or between the conductors. Capacitive touch pads are not limited to detection at intersections of the conductors. Conventional capacitive pads have the **problem** that if the conductors are spaced apart too widely, the detection becomes inaccurate, since a touch between the conductors gives rise to only limited data values for the interpolation process. Further, the palm of a hand held just above the device can be falsely identified as a touching action, since the palm induces a strong signal.

The **solution** is to alter the immediate capacitive environment of the system. Variations in capacitance may be propagated by high levels of capacitive coupling, or propagated directly via electrical conductivity (see page 11, lines 11-14).

1.2 According to the application (description), the above solution is achieved by providing the pad with an additional conductive layer (item 4 and 7; e.g. made from ITO material), even though this is not defined in present **claim 1**. The basic idea, however, of providing a pad with an additional conductive layer is already known from D1, D3 or D4.

D1 discloses a capacitive touch pad with two sets of spaced-apart, parallel conductor traces. The pad has an additional conductive layer (item 46). Touching the pad brings the conductor matrix and the conductive layer closer to each other so that the touch can be detected. The advantage is that the pad can also be used with a (non-conductive) stylus pen, not just with a human finger.

D1 discloses all the features of **claim 1**, so that the claim lacks novelty (Art. 33 (2) PCT):

A touch pad (D1, title) comprising
a supporting medium (D1, Fig. 2, item 12) supporting a plurality of spaced apart conductors (item 14, 18; see col. 6, from line 12) in which there is no electrical contact between the con-

ductors, each conductor being sensitive to the proximity of a finger (col. 5, lines 55-57) to modify the capacitance of said conductor to detect the present of said finger positioned close to that conductor,
the touchpad further comprising a means (conductive layer 24; see col. 6, from line 45) to concentrate electric field between conductors towards the plane of the supporting medium (col. 4, line 53: layer 24 is a metal layer that also acts as a shield for the electric field and prevents the electric field from emanating into the area above layer 24; this means that it concentrates the electric field between conductors towards the plane [item 16, 20] of the supporting medium).

It is noted that the embodiment shown in Fig. 2 of D1 is identical to the embodiment shown in Fig. 8 of the present application (see also Fig. 3 of the present application), while Fig. 3 of D1 corresponds to Fig. 4 of the application.

1.3 From D3 a combined finger touch and stylus detection system is known. It has transparent conductors arranged in a grid supported on a flexible, transparent overlay membrane. A unique interconnection pattern is located between the transparent conductors in the array and buses which interconnect the conductors with the supporting electronics, whereby a minimum number of bus wires can be employed. When the stylus signal has reached a contact threshold corresponding to the locate threshold distance, the operation of stylus detection shifts from proximity detection to a location and tracking mode (col. 5, from line 39). An electrostatic shield layer 51 consists of a full panel coating of indium tin oxide which is grounded. This coating shields the vertical X conductors and horizontal Y conductors from electrostatic noise generated by the cathode ray tube: In col. 10 (from line 65) D3 explicitly mentions that electric fields cannot travel through layer 51. This means that the field generated by the touch sensor (item Y3, X2 in Fig. 12) cannot pass through layer 51 either; this means that the layer concentrates the field in the area of the sensor.

D4 describes an illuminated touch pad for computing devices. It has a light emitting layer that generates light in response to the operator's input; this enables the user to know whether the touch pad has been activated or not for use of cursor control. The light emitting layer (Fig. 5, item 46) is located between two conductive layers (item 42 is made from ITO: see col. 5, line 49); this three-layer-sandwich is located underneath the actual touch pad (which in turn consists of the usual grid of capacitive surfaces connected by X- and Y-conductors). D4 explicitly refers to an "electric field" emanating from the touch sensor (col. 3, line 23). Dues to its properties, the layer 42 concentrates the field generated by the sensor (item 20) in the area of that sensor, towards the surface (item 10; i.e. away from layer 42).

D3 and D4 disclose a conductive layer (item 51 of D3, item 42 of D4) serving as a means to concentrate electric field between conductors towards the plane of the supporting medium. Consequently, the novelty of **claim 1** is also taken away by D3 and D4.

1.4 It is noted that, since **claim 1** does not specify how the means for concentrating actually works, also the generic prior art of D2 falls under this claim. Specifically, the conductor elements 12 and 14 (Fig. 2 of D2) serve, at the same time, as

- spaced apart conductors in which there is no electrical contact between the conductors (D2, col. 3, lines 43-61), as defined in present **claim 1**, and as
- means to concentrate electric field between conductors towards the plane of the supporting medium, as defined in present **claim 1** (the conductor grip of D2 generates the electric field and therefore also directs this field towards the supporting medium 10).

The subject matter of **claim 1** therefore lacks novelty over D2.

1.5 The above documents describe the idea of providing an electrically conductive medium proximal to the conductors, which (implicitly) locally modifies the capacitive environment between the conductors. Further, the supporting medium (non-conductive layer) of D1 is made of an insulating material (printed circuit board, see col. 3, lines 64/65). The discontinuous conductive layer covers the supporting medium. Hence **claims 2, 3, 5, 6, 7, 8 and 10** add nothing novel.

The other dependent claims define straightforward embodiments and possibilities from which the skilled person would select, in accordance with circumstances, without the exercise of inventive skill, in order to solve the problem posed. Most of these additional features are disclosed or suggested by the prior art on hand. Moreover the description does not make clear what specific advantages these additional features might imply. Therefore these claims add nothing inventive. Finally, the dependent claims are obviously not linked by one single general inventive concept (Rule 13 PCT).

1.6 It is not clear whether the embodiment shown in Fig. 3 with the metallic layer between the user's finger and the conductors can work. The layer 4 isolates the finger from the conductors 2, so that the finger cannot be sensed. A corresponding objection applies to Fig. 6-9 and 11.

Ad VII. - certain defects (form and content, Rules 5 - 7 PCT)

2.1 The independent claims are not in the two-part-form (features known from D1 should be placed in the preamble, Rule 6.3b PCT).

2.2 The claims contain no reference signs (Rule 6.2b PCT).

2.3 The relevant documents (D1, D3, D4) are not acknowledged in the description (Rule 5.1a PCT).

2.4 The unit "microns" used in **claim 32** is not a SI unit (Rule 10.1a PCT; see also pages 6, 7).

Ad VIII. - clarity, conciseness, support by the description (Art. 6 PCT):

3.1 The formulation "modify the capacitance of said conductor" in **claim 1** is unclear. One conductor does not per se have a capacitance; rather, capacitance is measured between two conductors.

3.2 The expression "concentrate electric field between conductors towards the plane of the supporting medium" at the end of **claim 1** is unclear.

Does it means that the electric field is limited to the area between the conductors? Or is the amount of the electric field enforced in this area? Does it mean that the direction of the field is changed (towards the medium): is the field directed?

The Applicant is reminded that the claims have to be clear even without the description.

It is noted that actually this feature merely defines a result to be achieved, without giving details as to how the desired effect should be achieved. It is essential to the invention that this means is an electrically conductive medium proximal to the conductors, such as defined in present claim 2. No other ways of concentrating electric field between conductors towards the plane of the supporting medium are supported by the description.

3.3 It is not clear what "modify the capacitive environment" should mean in **claim 3**.

3.4 The unit "Ohms per square" in **claim 15** is not understandable. Does it refer to Ohms/m, or Ohms/cm^2? (see also page 9)

3.5 The formulation "may be formed" in **claims 32, 33** is vague.

3.6 A period is missing at the end of **claim 24**.

3.7 Apparatus **claim 42** contains method features, so that it is not clear whether only a device in